CLAIMS:.

1. A process comprising the steps of:
   (a) providing a natural (e.g. plant) material;
   (b) extracting a first sample of the material with a polar solvent to produce a polar extract and a non-polar residue;
   (c) subjecting the polar extract of step (b) to ion-exchange chromatography to produce an extract enriched in ionic-compounds and a non-ionic residue;
   (d) chromatographically fractionating the enriched extract of step (c) to yield one or more polar fractions comprising one or more ionic (phyto)chemical(s).

2. The process of claim 1 wherein the enriched extract is chromatographically fractionated on an analytical scale.

3. The process of claim 2 wherein the chromatographic fractionation comprises gas-liquid chromatography.

4. The process of claim 3 wherein the enriched extract is derivitized prior to gas-liquid chromatography.

5. The process of claim 1 wherein the enriched extract is chromatographically fractionated on a preparative scale.

6. The process of claim 5 wherein the chromatographic fractionation comprises ion-exchange chromatography.

7. The process of any one of claims 1 to 6 further comprising: (i) extracting a second sample of the material or sequentially extracting the non-polar residue of the first sample with a non-polar solvent to produce a non-polar extract; (ii) subjecting the non-polar extract to hydrophobic interaction or reversed-phase chromatography to produce an extract depleted in fats and chlorophyll; and (iii) chromatographically fractionating the depleted extract to yield one or more non-polar fractions comprising one or more non-polar phytochemical(s).

8. The process of claim 7 wherein the depleted extract is chromatographically fractionated on an analytical scale.

9. The process of claim 8 wherein the chromatographic fractionation comprises high performance liquid chromatography (HPLC) and/or gas-liquid chromatography.

10. The process of claim 7 wherein the depleted extract is chromatographically fractionated on a preparative scale.

11. The process of claim 10 wherein the chromatographic fractionation comprises flash fractionation (e.g. normal phase silica chromatography) in conjunction with (for exampled followed by) high performance liquid chromatography (HPLC) (e.g. reverse phase HPLC).

12. The process of any one of the preceding claims further comprising scavenging the non-ionic residue for non-ionic species by: (i) subjecting the non-ionic residue of step (c) to hydrophobic interaction or reversed-phase chromatography to produce a scavenged non-ionic extract depleted in sugars; and (ii) chromatographically fractionating the scavenged extract to yield one or more scavenged fractions comprising one or more non-ionic phytochemical(s).

13. The process of claim 12 wherein the scavenged extract is chromatographically fractionated on an analytical scale.

14. The process of claim 13 wherein the chromatographic fractionation comprises high performance liquid chromatography (HPLC) or GC-MS.

15. The process of claim 12 wherein the scavenged extract is chromatographically fractionated on a preparative scale.

16. The process of claim 15 wherein the chromatographic fractionation comprises flash fractionation (e.g. normal phase silica chromatography) in conjunction with (for exampled followed by) high performance liquid chromatography (HPLC) (e.g. reverse phase HPLC).

17. The process of any one of claims 1 to 16 for producing a library of phytochemicals, further comprising the steps of collecting and isolating the fractions and ordering and arraying the isolates.

18. The process of claim 17 wherein the process is applied iteratively to a series of different plant source materials.

19. The process of any one of claims 1 to 16 for producing a phytochemical profile of a plant, further comprising the step of characterizing the fraction(s).

20. The process of claim 19 for establishing a standard specification for a medicinal plant material, the process further comprising the steps of characterizing the fraction(s) and defining a standard specification for the said plant material on the basis of the characteristics defined.

21. The process of any one of claims 1 to 16 for preparing a plant extract, wherein the fractionation step(s) comprise preparative chromatography.

22. The process of any one of claims 1 to 16 for producing an isolated phytochemical, further comprising the steps of collecting the fraction(s) and isolating the phytochemical therefrom.

23. The process of any one of claims 1 to 16 for screening a plant for the presence of a biologically active phytochemical, further comprising the step of characterizing the fraction(s) to yield an index of biological activity.

24. The process of any one of claims 1 to 16 for producing a phytochemical directory wherein the plant source material is derived from a single botanical reference source and the process further comprises an iterative cycle of the following steps:

(a) characterizing the fraction(s);

(b) determining whether the characterized fraction(s) contain a phytochemical of interest, thereby obtaining data;

(c) associating the data obtained in (f) with the botanical reference source to produce a phytochemical directory component,

whereby iteration of the steps (a) to (c) with a plurality of different botanical reference sources produces a plurality of directory components and thereby forms a phytochemical directory.

25. The process of any one of the preceding claims wherein the fractionation of the enriched extract yields a defined fraction or an isolated (e.g. substantially pure) ionic phytochemical.

26. The process of any one of claims 7 to 25 wherein the fractionation of the depleted extract yields a defined fraction or an isolated (e.g. substantially pure) non-polar phytochemical.

27. The process of any one of claims 12 to 26 wherein the fractionation of the scavenged extract yields a defined fraction or an isolated (e.g. substantially pure) non-ionic phytochemical.

28. The process of any one of the preceding claims wherein the phytochemical is selected from:

(a) a drug;
(b) an agrochemical;
(c) a pesticide;
(d) a toxin;
(e) a template molecule for use in the generation of a combinatorial library;
(f) a food, food additive or functional food ingredient.
(g)

29. The process of any one of the preceding claims wherein the fraction(s) are characterized.

30. The process of claim 29 wherein the fraction(s) are characterized:

(a) functionally; and/or
(b) physically; and/or
(c) chemically.

31. The process of claim 30 (a) wherein the functional characterization comprises a biological assay, for example selected from:

(a) *in vivo* or *in vitro* assays; and/or
(b) enzyme inhibition assays (e.g. glycosidase and/or lipase inhibition); and/or
(c) receptor binding assays; and/or
(d) cellular assays (e.g. cell replication, cell-pathogen, cell-cell interaction and cell secretion assays); and/or

(e) immunoassays; and/or

(f) anti-microbial activity (e.g. bacterial and viral cell-binding and/or replication) assays; and/or

(g) toxicity assays (e.g. LD_{50} assays).

32. The process of claim 30 (b) wherein the physical characterization is selected from:

(a) quantification of the phytochemical component(s); and/or

(b) measurement of the purity of the constituents; and/or

(c) determination of molecular weight (or molecular weight distribution or various statistical functions thereof in the case of fractions which comprise a plurality of different phytochemical constituents); and/or

(d) determination of the molecular formula(e) (e.g. by nuclear magnetic resonance); and/or

(e) spectral analysis.

33. The process of claim 32 (e) wherein the spectral analysis produces:

(a) mass spectra (e.g. the mass to charge (m/z) value versus abundance), and/or

(b) chromatographic data (e.g. spectra, column retention times, elution profiles etc), and/or

(c) photodiode array (PDA) spectra (e.g. in both UV and visible ranges), and/or

(d) nuclear magnetic resonance (NMR) spectra (e.g. spectral data sets obtained *via* ^{1}H and/or ^{13}C NMR).

34. The process of claim 33 wherein the spectral characterization is coupled with the fractionation step, for example by use of GC-MS and/or HPLC-PDA-MS.

35. The process of claim 30 (c) wherein the chemical characterization measurements of:

(a) the chemical reactivity of phytochemical constituent(s); and/or

(b) the solubility of phytochemical constituent(s); and/or

(c) the stability and melting point of phytochemical constituent(s).

36. A library of phytochemicals obtainable by the process of claim 17 or claim 18.

37. A kit of parts comprising the library of claim 36.

38. The process of any one of claims 1 to 35 for producing a herbal medicinal product, the process further comprising the step of characterizing the fraction(s) and determining

whether the product meets a standard specification for the said product on the basis of the characteristics defined.

39. The process of claim 38 wherein the process further comprises establishing a standard specification for the medicinal plant material according to the process of claim 20.

40. A herbal medicament obtainable by the process of claim 38 or claim 39.